vidual segments illuminate different image areas of the image recording device, so that by means of the retransfer of information according to the invention about the location of the relevant markers to the control unit of the lighting device, only the relevant image areas can be illuminated by accessing the corresponding segment. Additionally, the direction of the rays can be controlled by diffractive or refractive optical elements, since tracking cameras usually operate with almost monochromatic light. Fresnel prismatic disks adapted to the geometry of the lighting device are suitable as refractive elements.

The entire information retransfer according to the invention, the computation of the respective retransferred information, the control and adjustment of individual components by the retransferred information, components such as image recording devices, computing devices and control units, can be carried out advantageously by means of a computer program, which is executed in a computing device specially provided for it or in the already mentioned central computing device for determining the location and/or position of the objects. A corresponding computer program product contains the computer program in a suitable data carrier, such as EEPROMs, flash memories, CD ROMs, floppy disks or hard disk drives.

In the following, the invention and its advantages are explained in detail with reference to the embodiments which are schematically illustrated in the accompanying Figures.

Figure 1 shows in schematic form an embodiment of the data flow chart of an optical tracking system according to the invention.

Figure 2 shows in schematic form the data flow chart

of an embodiment of a tracking system according to the invention, which operates with a lighting device for passive markers.

Figure 1 shows a general data flow chart for the information retransfer according to the invention. The tracking system comprises a plurality of image recording devices 1, the computing devices 2 allocated to the image recording devices for determining the two-dimensional position of markers in the recorded image and a central computing device 3, in which the marker position data of the individual image recording devices 1 are collected and used for calculating the position and/or orientation data of the object. Reference should be made to the fact, that the components shown in Figure 1 represent the data flow, which manifests itself in a logical separation of the different processing stages, and that this logical separation is not necessarily accompanied by a physical separation. Consequently, in the practice it is possible, for example, to combine the components, image recording device 1 and 2D-computing device 2 or the components, 2D-computing device 2 and 3D/6D-computing device 3 or even all three components into one apparatus, respectively. The central computing device 3 delivers the tracking results mostly to an additional, not shown computing device for further processing the results or to a not shown storage medium.

According to the invention, in this embodiment, useful data is retransferred from the central computing device 3 to the preceding processing stages, namely in this case, to the image recording device 1 and also to the computing device 2 allocated to this image recording device. The information retransfer channel is identified with 6. Physically, the information retransfer channels can use the same data transfer medium as the one for the transfer of data

from image recording devices to allocated computing devices 2 and further to the central computing device 3. For better illustration, the data channels are drawn separately in the data flow chart according to Figure 1.

In this embodiment, the means for information retransfer also include a prediction stage 5, which calculates from the result data of the direct past, expected values for the image to be captured at the moment. The data obtained is then forwarded to the image recording devices 1 and the allocated computing devices 2. Because of the prediction, the value of the retransferred data is increased further.

An object identified with markers 4 is captured during its movement in space by the image recording devices 1, which are CCD cameras. The individual images are evaluated in a succeeding computing device 2 (2D-computing stage) to the effect that the position of the markers 4 in the image is determined. Since location and orientation of the image recording device 1 are known, from the position data of the markers 4 in the images recorded, the position, i.e. the three-dimensional location, of the object can be determined in a central computing device 3 by means of appropriate trigonometric algorithms. When more than 2 markers 4 are used, additionally more information can be obtained about the orientation of the object. Depending upon the type of application, the tracking results are reused in an additional computing device, for example, for the production of virtual film sequences.

In a prediction device 5 which can be the physical part of the central computing device 3, from the tracking results taken over a specified period of time, expected results are calculated for the respective images to be